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of substances by living protoplasm, a thing possible through a self-regulated change in the condition of permeability of the plasmatic membranes such that the organism is able at pleasure to reverse it." He finds that the ferment of Roman bread and Chianti wine truly secretes invertase, by the augmentation of the permeability of the protoplasm during the period of fermentative activity. This increased permeability is general, various salts escaping more freely at the same time. In *Mucor stolonifer*, however, the emission of invertase seems to have the character of a free exit of materials from dying parts, coincident with spore formation. Whether it has a true but weak secreting power remains for further study.—C. R. B.

Respiration.—PALLADIN distinguishes²⁵ three sources of the respiratory CO₂ of plants: (1) nucleo-CO₂ produced by the action of enzymes, which, partly soluble, partly insoluble in expressed sap, are intimately bound up with the protoplasm; (2) stimulation-CO₂, formed by the protoplasm itself (apparently directly) under the action of stimuli; (3) oxydase-CO₂, produced by various oxidases. The process which characterizes animal and plant life consists in the excretion of nucleo-CO₂ which is formed by decomposition without the participation of atmospheric oxygen. Intramolecular respiration is a primary phenomenon, whose CO₂ is principally nucleo-CO₂ and in some cases also stimulation-CO₂. But alcoholic fermentation is no simple phenomenon, and, as KOSTYTSCHEW has shown, must be distinguished from intramolecular respiration.—C. R. B.

Apple and pear rot.—LONGYEAR²⁶ has published the results of his study of a rot of apples and pears due to an undescribed species of *Alternaria*. The same disease has so far been found in California, Colorado, and Michigan, and in Colorado is one of the most widely distributed and common diseases of apples. PADDOCK²⁷ was the first to call attention to it. In the case of the apple the disease attacks the fruit only, but it attacks the fruit, leaves, and young sprouts of the pear. In the apple it appears frequently first at the blossom end of the fruit and, in the case of sorts having a deep calyx-tube, a core-rot may occur. The disease may be controlled by spraying with Bordeaux mixture and plowing under or removing the diseased fruits in which the fungus is able to pass the winter.—E. MEAD WILCOX.

Reduction division.—The earliest organisms were doubtless non-sexual. In phylogeny, according to SCHAFFNER,²⁸ the conjugation of nucleated cells introduced

²⁵ PALLADIN, W., Ueber den verschiedenen Ursprung der während der Atmung der Pflanzen ausgeschiedenen Kohlensäure. Vorläufige Mitteilung. Ber. Deutsch. Bot. Gesells. 20: 240-247. 1905.

²⁶ LONGYEAR, B. O., A new apple rot. Bull. Col. Agric. Exp. Stat. 105: 1-12. pls. 1-4. 1905.

²⁷ PADDOCK, W., A new apple disease. Rept. Col. Exp. Stat. 17: 99. 1904.

²⁸ SCHAFFNER, JOHN H., The nature of the reduction division and related phenomena. Ohio Naturalist 5: 331-340. 1905.

a disturbance into the life cycle and a reduction division of some kind became an inevitable accompaniment. The places at which a reduction division might, theoretically, become established in the life cycle are presented in diagram and described. A comparison between the life cycles of plants and animals is also illustrated by a diagram. SCHAEFFNER believes that in the higher animals the condition appears to be similar to that found in *Fucus*.

The significance of a transverse division of chromosomes in interpreting the phenomena of MENDEL'S law is illustrated and discussed.—CHARLES J. CHAMBERLAIN.

Migration of salts.—In an extensive investigation of the content of nitrogen, phosphoric acid, sodium, and potassium in cultivated plants, both field and pot grown, at different periods of their development, it has been found²⁹ that in different plants the maximum absorption is completed at different periods, barley, spring wheat, peas, and mustard attaining this maximum at flowering, while potatoes reach it at maturity. These substances do not remain at a maximum, but in the plants other than potatoes and with the exception of phosphoric acid, migrate back, in great part, to the soil; this seems to depend on the amount of a given substance available, being greater when, say, potassium is lacking than if the appropriate materials are all supplied.—C. R. B.

Anatomy and affinity.—Another observer, SARTON, has attempted to ascertain how much help is to be had from histology in determining the validity of Jordanian species as contrasted with Linnean.³⁰ He studied allied plants, submitted them to cultivation under diverse conditions and then examined their structure. In some cases there were constant anatomical characters distinguishing apparently closely allied forms. On the other hand the characters were as often elusive and evidently directly adaptive. Plants long cultivated in the Jardin des Plantes and at Fontainebleau showed no anatomical differences from wild ones of the same species. Nor were there differences between the varieties having different colored flowers.—C. R. B.

Scotch moors.—The succession of plants in the moors of the Scottish southern uplands has been studied by LEWIS.³¹ He finds that in all the localities visited the peat "shows a definite stratification of plant remains, indicating a swing from woodland to heath and moss, and again to woodland. In some districts, an arctic plant-bed is interposed between the lower and upper woodland beds." The vegetation changes are probably correlated with climatic changes at the

²⁹ WILFARTH, H., RÖMER, H., and WIMMER, G., Ueber die Nährstoffaufnahme der Pflanzen in verschiedenen Zeiten ihres Wachstums. Landw. Versuchsstat. **63**: 1-70. pls. 3. 1905.

³⁰ SARTON, A., Recherches expérimentales sur l'anatomie des plantes affines. Ann. Sci. Nat. Bot. IX. **2**: 1-115. pls. 14. 1905.

³¹ LEWIS, F. J., The plant remains in the Scottish peat mosses. Pt. I. The Scottish southern uplands. Trans. Roy. Soc. Edin. **41**: 699-722. 1905.